ESIP
Federation of Earth Science Information Partners
MAKING DATA MATTER

This file is a compilation of presentation slides by education experts from a panel at the first meeting of the ESIP Climate Change Education Working Group (CCEWG) on January 4th, 2011.

Nina Jackson (NOAA/NESDIS)
Ed Geary (GLOBE)
Dave Campbell (NSF)
Tamara Ledley (Climate Literacy Network)
LuAnn Dahlman (NOAA Climate Program Office)
Lin Chambers (NASA GCCE)

The panel was facilitated by Margaret Mooney, ESIP Education Chair and 22 people attended the session.

# Climate Change Education Working Group

Nina Jackson
NOAA Satellite and Information Service
Education Program Manager
(301)713-9604
Nina.Jackson@noaa.gov

January 4, 2011

1) **Challenge**
   a. Communicating Climate Change outside the Classroom

2) **How ESIP Ed and CCEWG Provide Assistance**
   a. Developing nation-wide communications and strategies

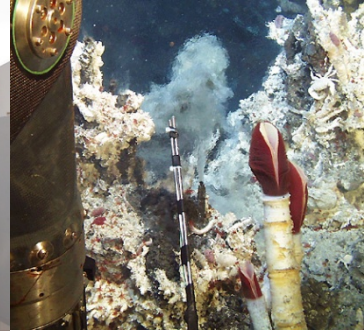
   b. Creating a process for distribution

3) **Other Topics**
   a. Books vs. IT in the classroom

   b. Community Science
   (Leveraging partnerships)







# The GLOBE Program:
## Promoting "Climate Change" Education, through Effective Data Collaborations between Students, Teachers, and Scientists


**Dr. Edward E. Geary, GLOBE Director**

**ESIP Federation Meeting-----4 January 2011, Washington, D.C.**

NASA NOAA NSF U.S. Department of State

# Climate Education Challenges

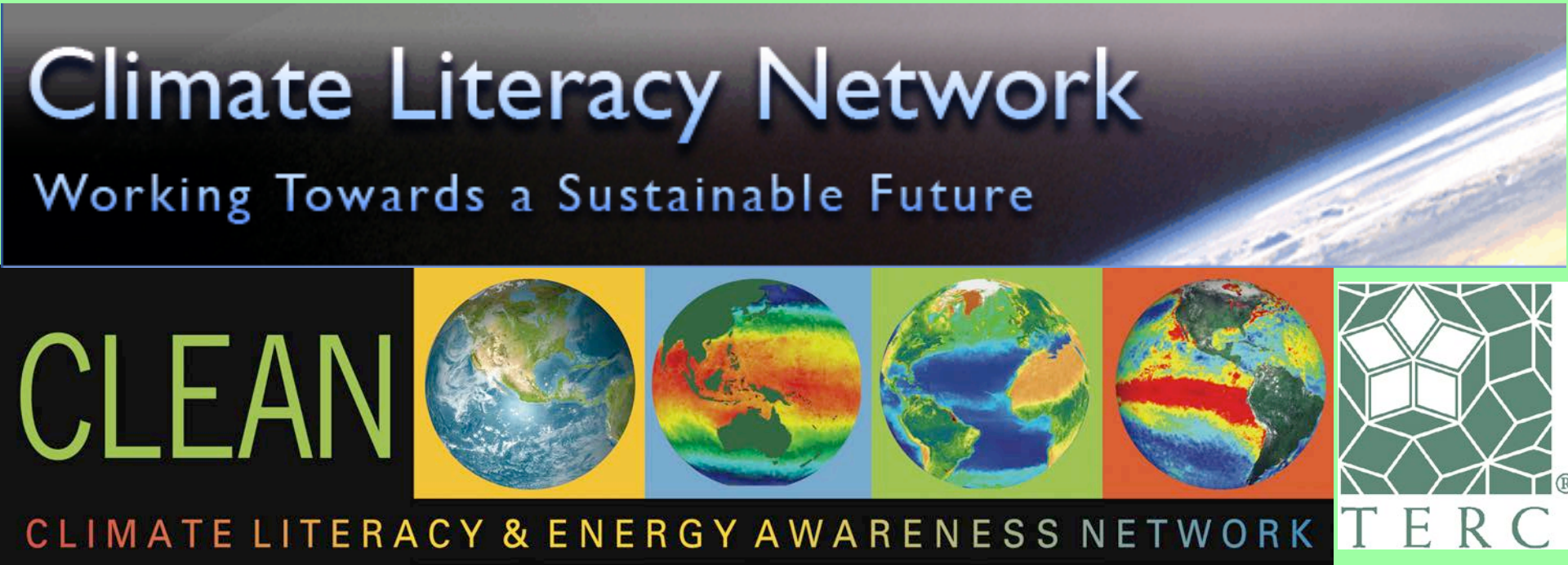
- Complexity of Topic
- Lack of National Curriculum(s) with strong Earth System Science and Climate components
- Politics of “Climate Change”
- Need for Professional Development
- Lack of Time, Sense of Urgency
- Traditional practices, structures, and behaviors
- Easy Data access, visualization, and analysis
- Diverse “User” Needs
- Need for Climate Education Research

# Climate Change Education: ESIP and GLOBE

- Focus on Data Needs of Students and Teachers
  - Access (local and regional data sets)
  - Visualization and Analysis Tools and Services
  - Sharing and Reporting
  - Language/Translation Support
- Possibilities:
  - Recruit and match “Data Mentors” from ESIP with schools
  - Provide Data support for GLOBE schools engaged in the Student Climate Research Campaign
  - Create standard data templates and API’s for Mobile devices

# Climate Literacy Network
# Climate Literacy and Energy Awareness Network (CLEAN) Pathway
# CLEAN-New England
# TERC

Tamara Shapiro Ledley



# Challenges to Climate Change Education?

- Interdisciplinary
- Earth system science
- Change over time
- Making relevant to the individual – person, business, government, etc
- Trusted source of information
  - Source from within community/group

# What can the ESIP Federation CCEWG do to support Climate Change Education Efforts?

- Science review of resources – existing and as they are developed
- Provide scientific expertise on local/regional/global issues as they arise in the development of educational materials and resources
- Provide an avenue for ESIP scientific research projects to address the Broader Impacts component of their proposals through climate change education and outreach efforts.

# Earth Science Information Partners Winter meeting Climate Change Education Working Group panel

David Campbell
National Science Foundation
Education Directorate, Division of Research on Learning in Formal and Informal Settings
dcampbel@nsf.gov
January 4, 2011

# What is the greatest challenge to climate change education?

# How can ESIP best serve NSF in climate related goals?

- Press Release 10-165
  **Climate Change Education Partnership Program Is Launched**
- **Innovative education strategies advance climate science literacy**
- September 10, 2010

- Introducing cutting-edge science topics can be a challenge, due to the constantly evolving nature of scientific research. But an innovative new science education program aims to meet that challenge when educating students, teachers, and the public about global climate change and its impacts.
- Today, the National Science Foundation (NSF) announced 15 awardees who will take the lead in planning collaborations across the United States as part of the Climate Change Education Partnership (CCEP) program. This program will connect climate scientists, experts in theories on how people learn science, and formal and informal education experts, with the goal of increasing public understanding of global climate change and preparing the next generation of scientists and educators.

# CCEP1 awards

- **MADE-CLEAR: Maryland Delaware Climate Change Education, Assessment, and Research**
- **Climate Science Meets Social Psychology and Strategic Communications: Applying proven learning and communications strategies to climate literacy in the San Diego Region**
- **Central Great Plains Climate Change Education Partnership**
- **Climate Literacy Zoo Education Network**
- **Partnership for Education on Climate Change, Engineered Systems, and Society**
- **Making the Global Local - Unusual Weather Events as Climate Change Educational Opportunities**
- **Climate Change Science and Solutions: Creating innovative education tools for Native Americans and other rural communities on the Colorado Plateau**
- **Climate Literacy Partnership in the Southeast (CLiPSE)**
- **Pacific Islands Climate Change Education Partnership**
- **Polar Learning And Responding: POLAR Climate Partnership**
- **The Great Lakes Climate Change Science and Education Systemic Network (GLCCSESN)**
- **Coastal Areas Climate Change Education (CACCE) Partnership**
- **Urban Climate Education Partnership**
- **National Network for Ocean and Climate Change Interpretation**
- **Building Place-Based Climate Change Education through the Lens of National Parks and Wildlife Refuges**

LuAnn Dahlman
NOAA Climate Program Office
Education Specialist
www.climate.gov

Climate Change Education Working Group
ESIP Federation
Winter 2011 Meeting
January 4, 2011
Washington, D.C.

NOAA's long-term goal for climate:

An informed society anticipating and responding to climate and its impacts

The Earth science education community has been trying to solve this problem in relative isolation.

# The Earth science education community has been trying to solve this problem in relative isolation.

“A majority of Earth science teachers were found to include climate and climate change in their courses. However, the majority of teachers of other science subjects only informally discuss climate change, if at all. “

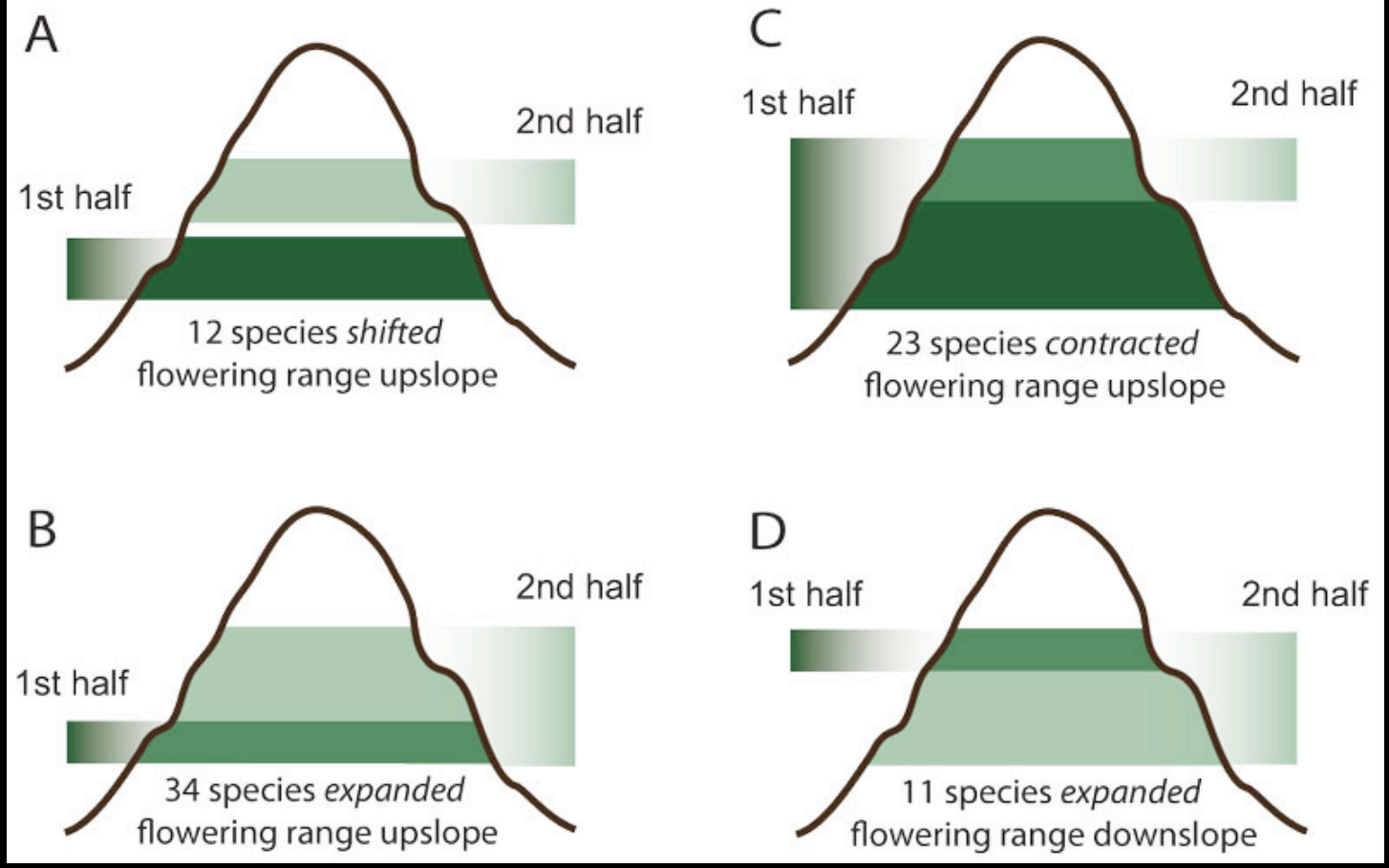
Sarah B. Wise. "Climate Change in the Classroom: Patterns, Motivations, and Barriers to Instruction Among Colorado Science Teachers." *Journal of Geoscience Education*. 58.5 (2010): 297-309. Print.

I see a rich opportunity to join forces with educators who teach other subjects in a range of venues to develop new learning activities.

ESIP Federation members or groups can contribute by providing support for and vetting of these materials.

# Application-level learning activities and test questions related to climate for biology, chemistry, physics and mathematics courses

Q14. Which of the shifts in flowering ranges depicted below support the hypothesis that plants are migrating upslope in response to increased temperatures?



# Writing prompts that encourage students to consider and describe how climate change affects their environment: physically, culturally, socially, and politically

On their anniversary, your parents reveal that during their honeymoon several decades ago, they bought a beach cottage on a small island in the Pacific. They are now thinking of their tropical paradise as their retirement home. How would you advise them?

By 2050, increased frequencies of severe weather events and higher costs associated with carbon-based energy use may result in substantial changes to current lifestyles. Choose one facet of your current family life and explore the how it might be different in a warmer world.

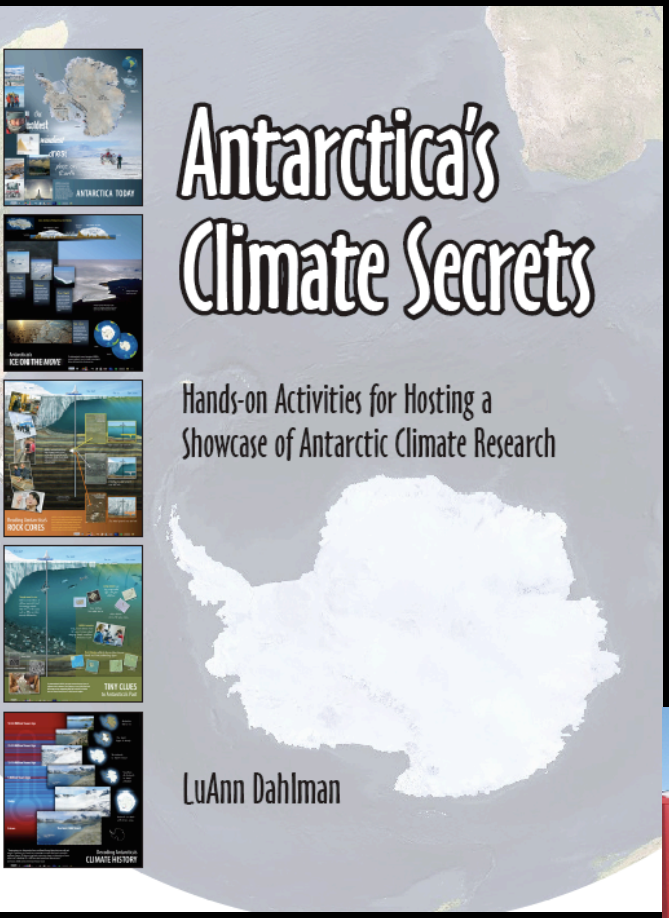
# Opportunities to create and admire art that inspires people to address the impacts of and solutions to climate change

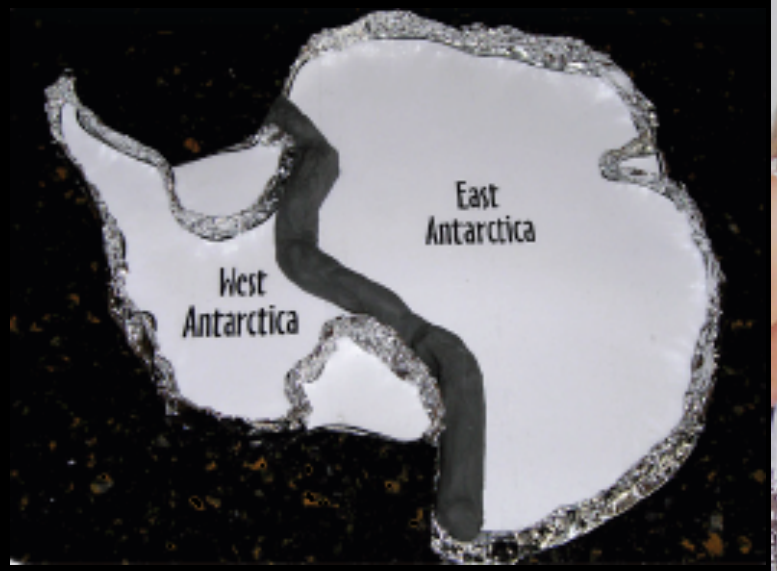

Freedom
By Jason Dietrick

CoolClimate Art
deviantart.com

# Active games and field experiences that reward stewardship of the commons

# Content for after-school clubs and other informal learning venues

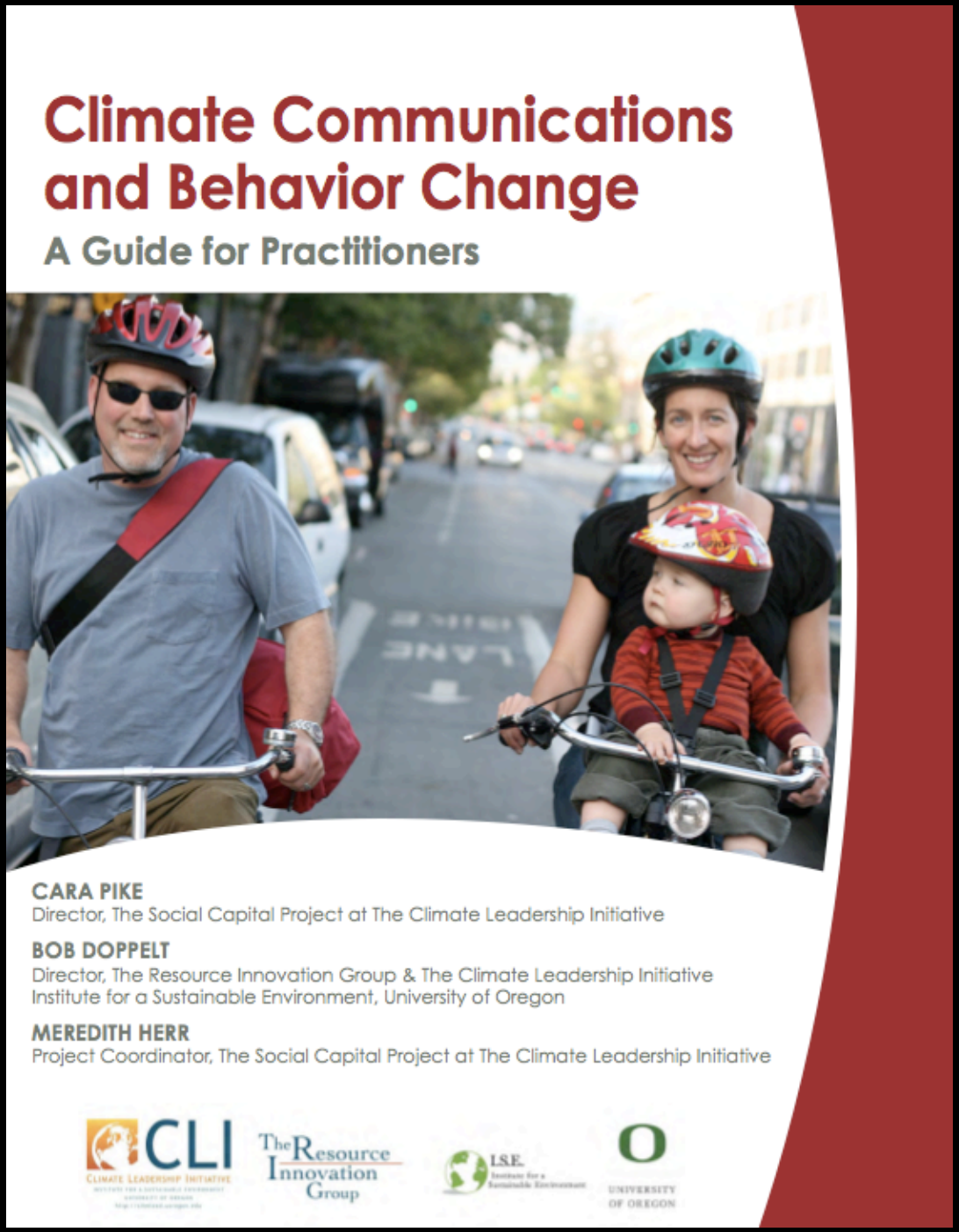




Opportunities outside public education

Everyone who is informed can be a voice for understanding and responding to climate in their own communities.




Climate Leadership Institute

# CLIMATE WISCONSIN STORIES FROM A STATE OF CHANGE







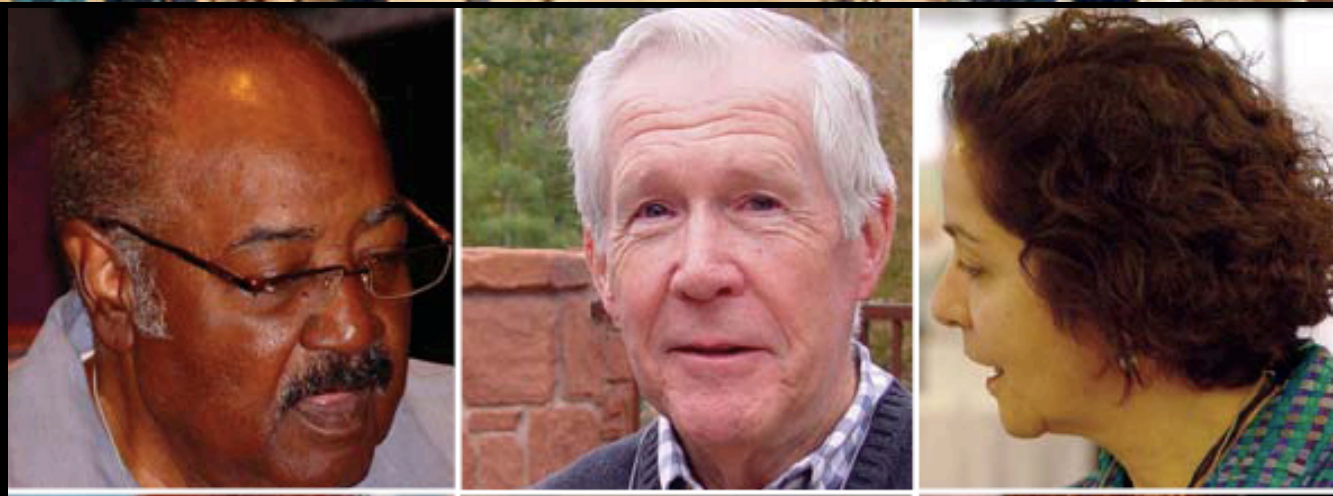


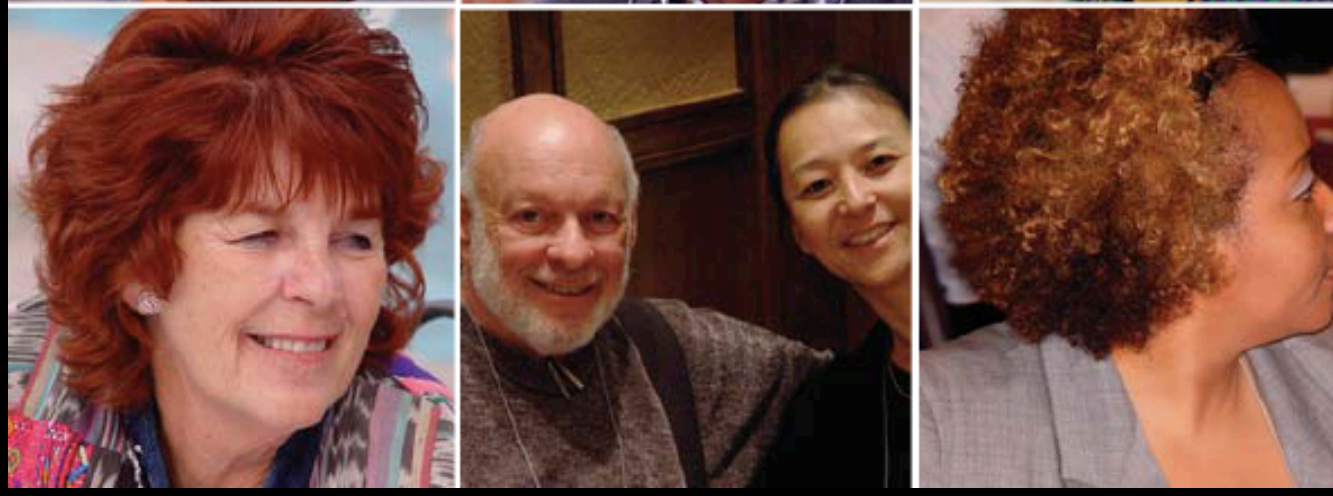


# Osher Lifelong Learning Institute

OLLI
—An adventure in intellectual, cultural, and social exploration for adults age 50 and above.

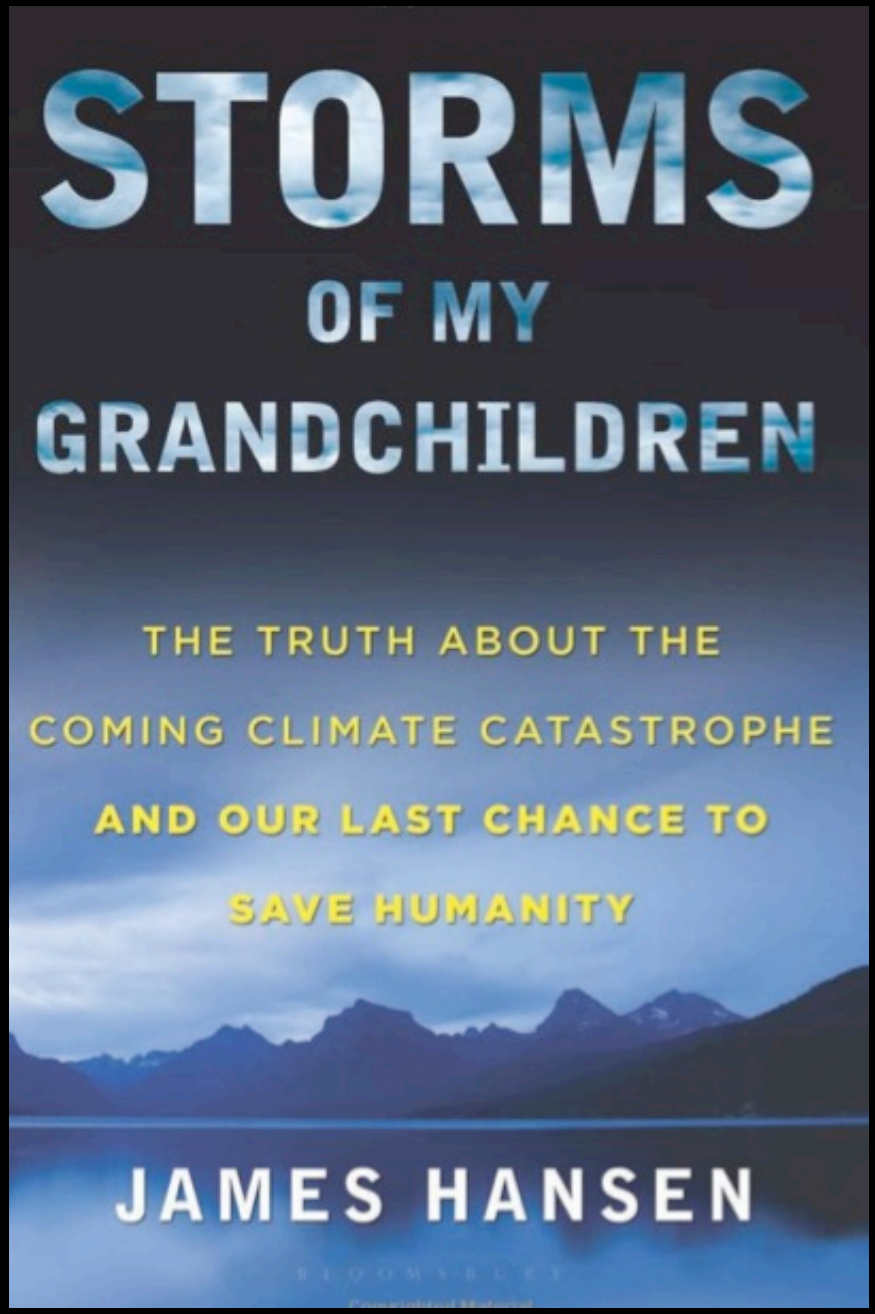
NOAA's Climate Program Office will sponsor an eight-session OLLI course on climate in northern Virginia in spring 2011





Participate in a virtual or face-to-face book club.

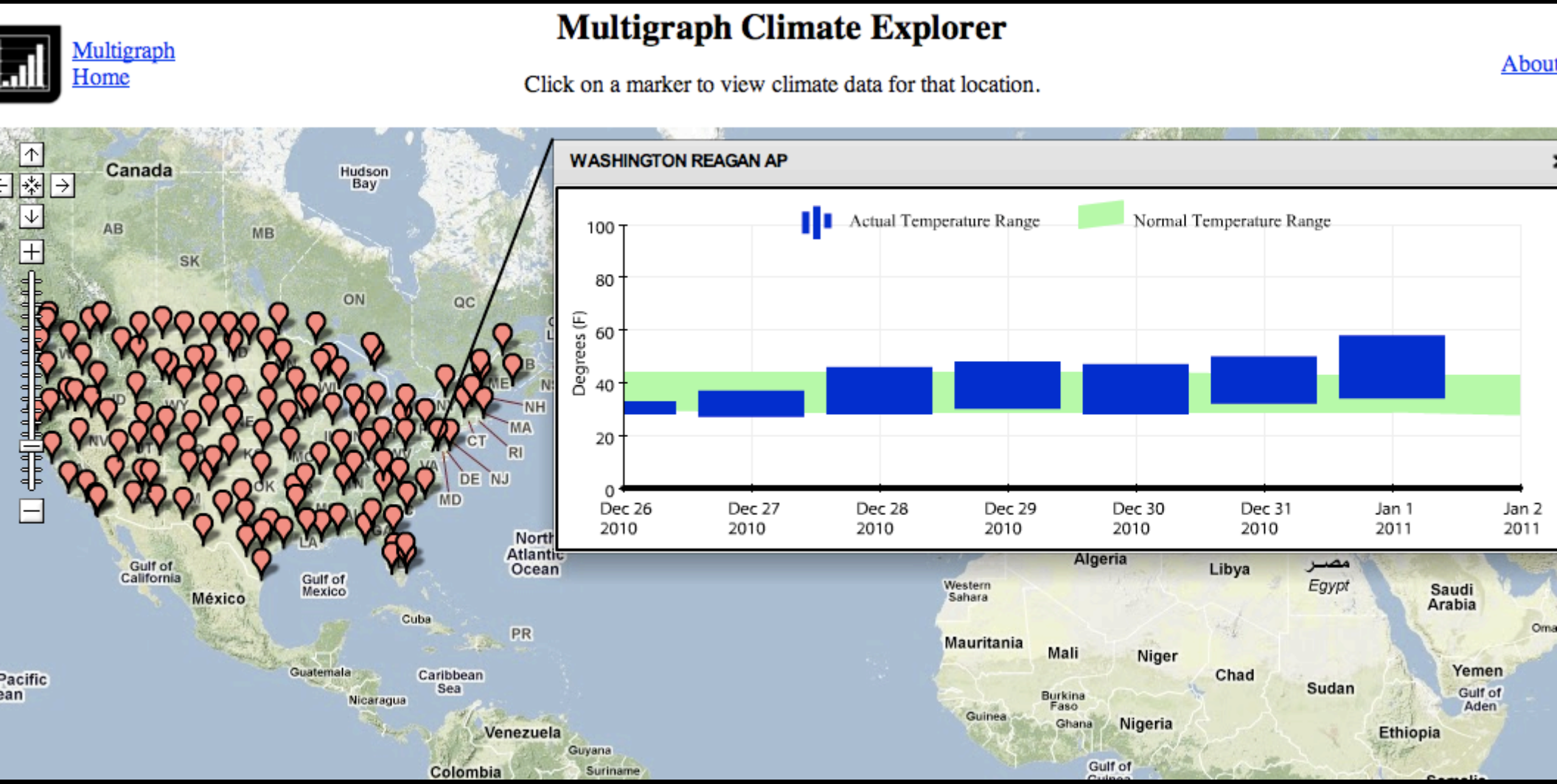
Contribute discussion questions (with answers) that encourage people to read and discuss climate-related books



# Promote a fundamental shift in vocabulary

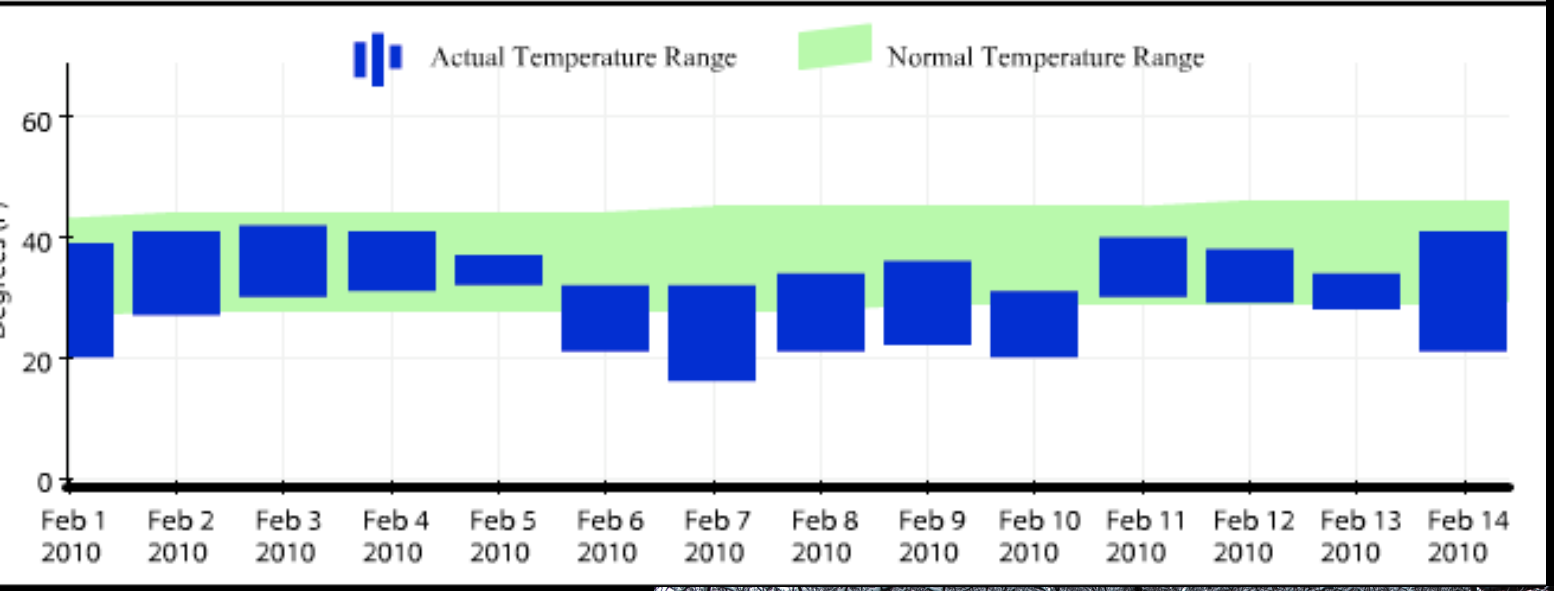

Wintry weather and global warming

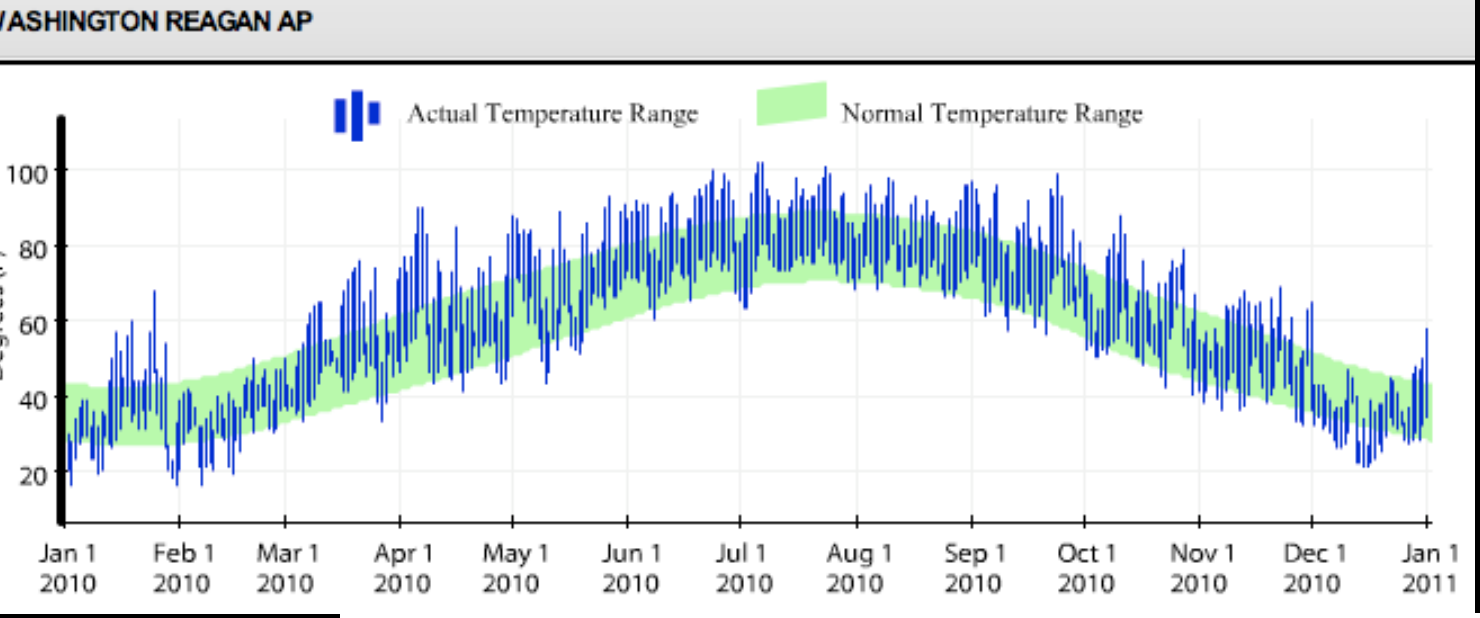
# Promote a fundamental shift in vocabulary

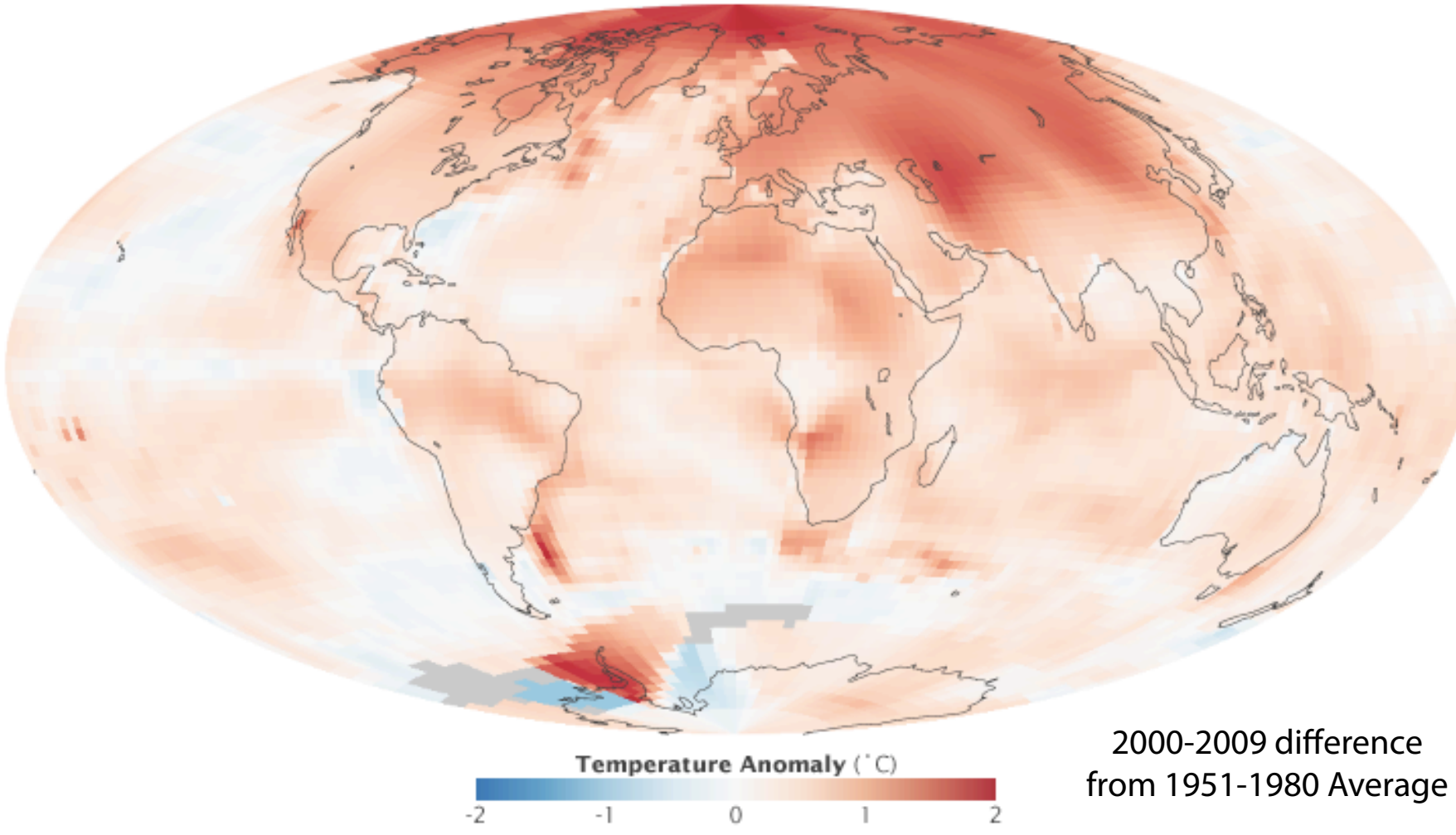



http:/climateexplorer.multigraph.org

VASHINGTON REAGAN AP



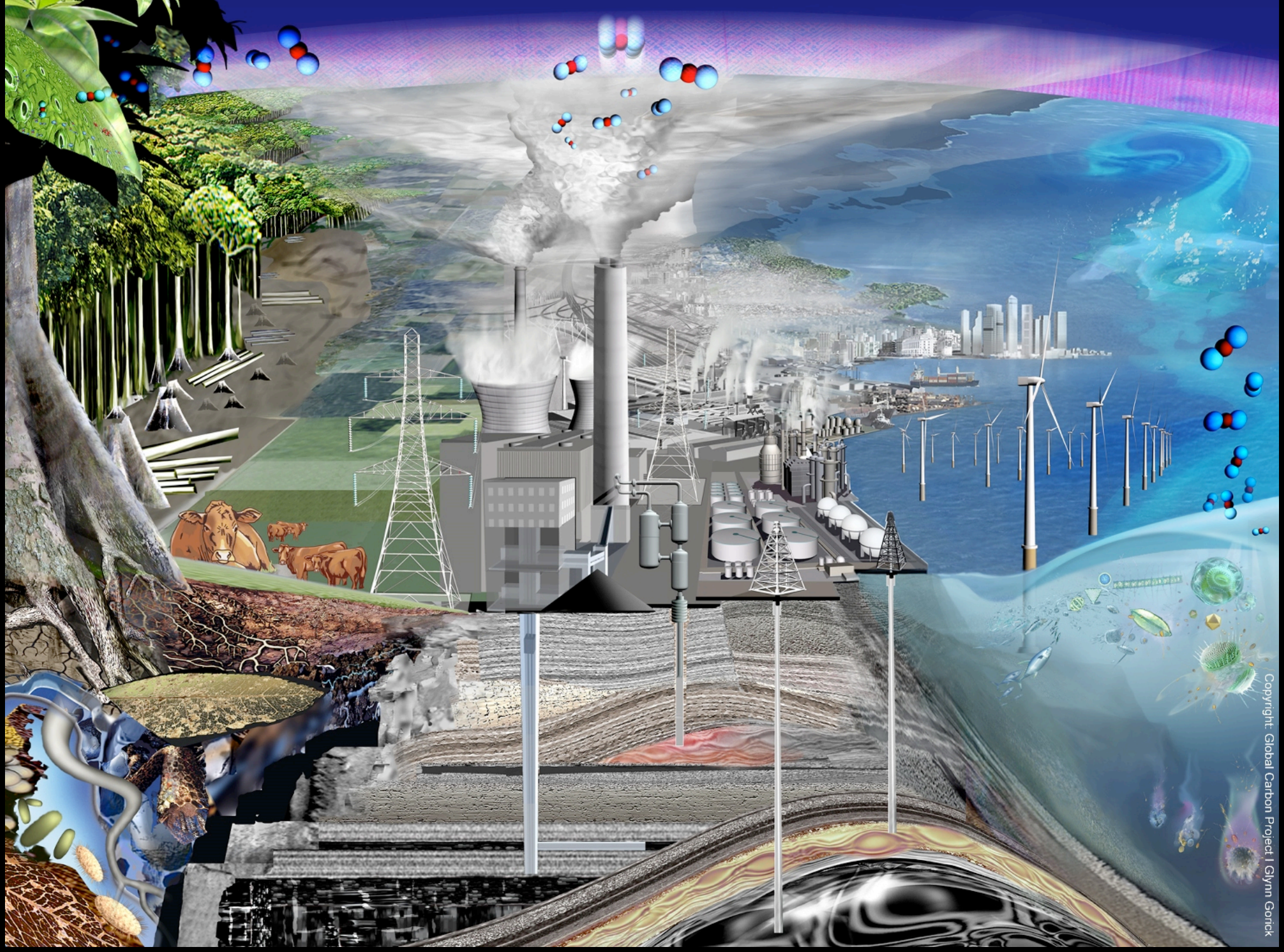




2000-2009 difference
from 1951-1980 Average

A final challenge:

We're running out of time.

To avoid really messing things up, some models suggest that global emissions need to peak by 2020, followed by substantial annual reductions.




Human Perturbation of the Carbon Cycle

LuAnn Dahlman
NOAA Climate Program Office
Education Specialist
www.climate.gov

Climate Change Education Working Group
ESIP Federation
Winter 2011 Meeting
January 4, 2011
Washington, D.C.

# Global Climate Change Education in NASA

L. H. Chambers, M. Pippin, S. Welch, K. Spruill
NASA Langley Research Center

M. Matthews, C. Person
NASA Headquarters

# Project Goals

- Increase the level of climate literacy and engagement of the United States public.
- Create a diverse, highly skilled, and motivated future workforce in climate-related sciences.

# Project Objectives – 2010 Update

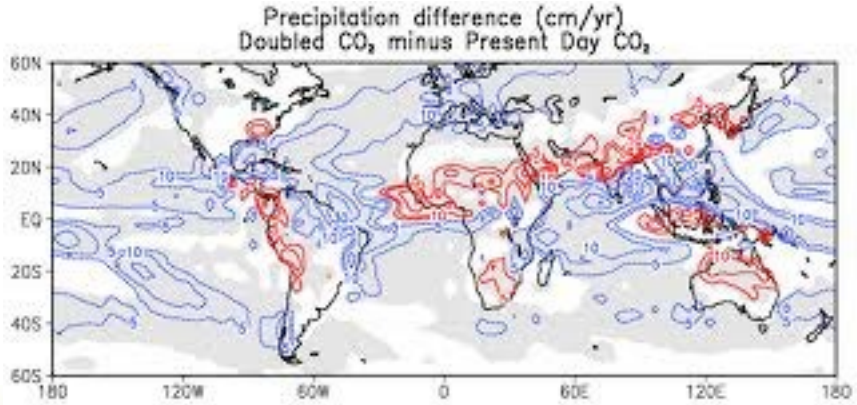
Objective 1: Increase the number of underrepresented/underserved students prepared to teach climate change content within STEM subjects;

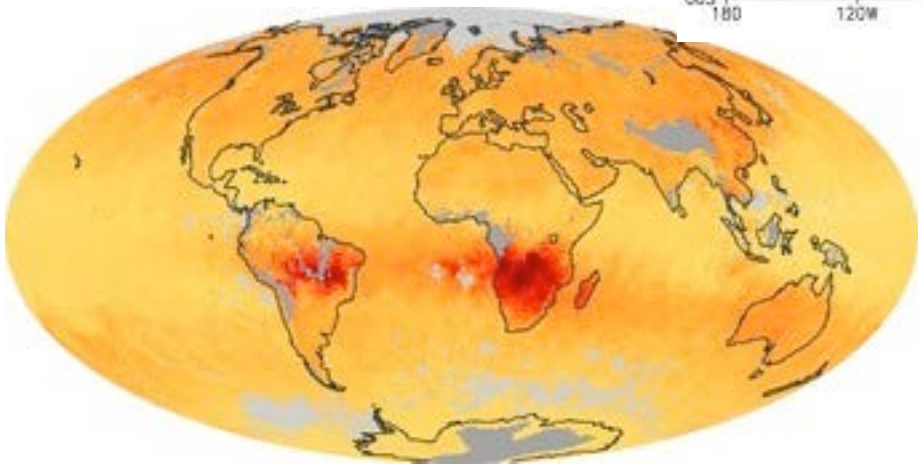
Objective 2: Increase the number of underrepresented/underserved undergraduate students prepared for employment and/or to enter graduate school in technical fields relevant to global climate change;

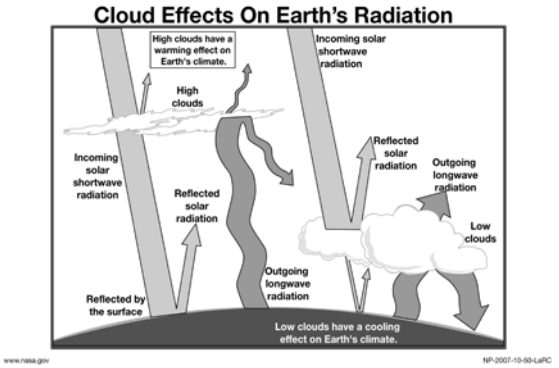
Objective 3: Advance the understanding of how to effectively teach global climate change concepts.

# NASA Relevance

- All projects are expected to make use of NASA's unique contributions to climate and Earth system science, including the use of NASA Earth observation data, basic to more complex interactive Earth system models, and/or simulations.



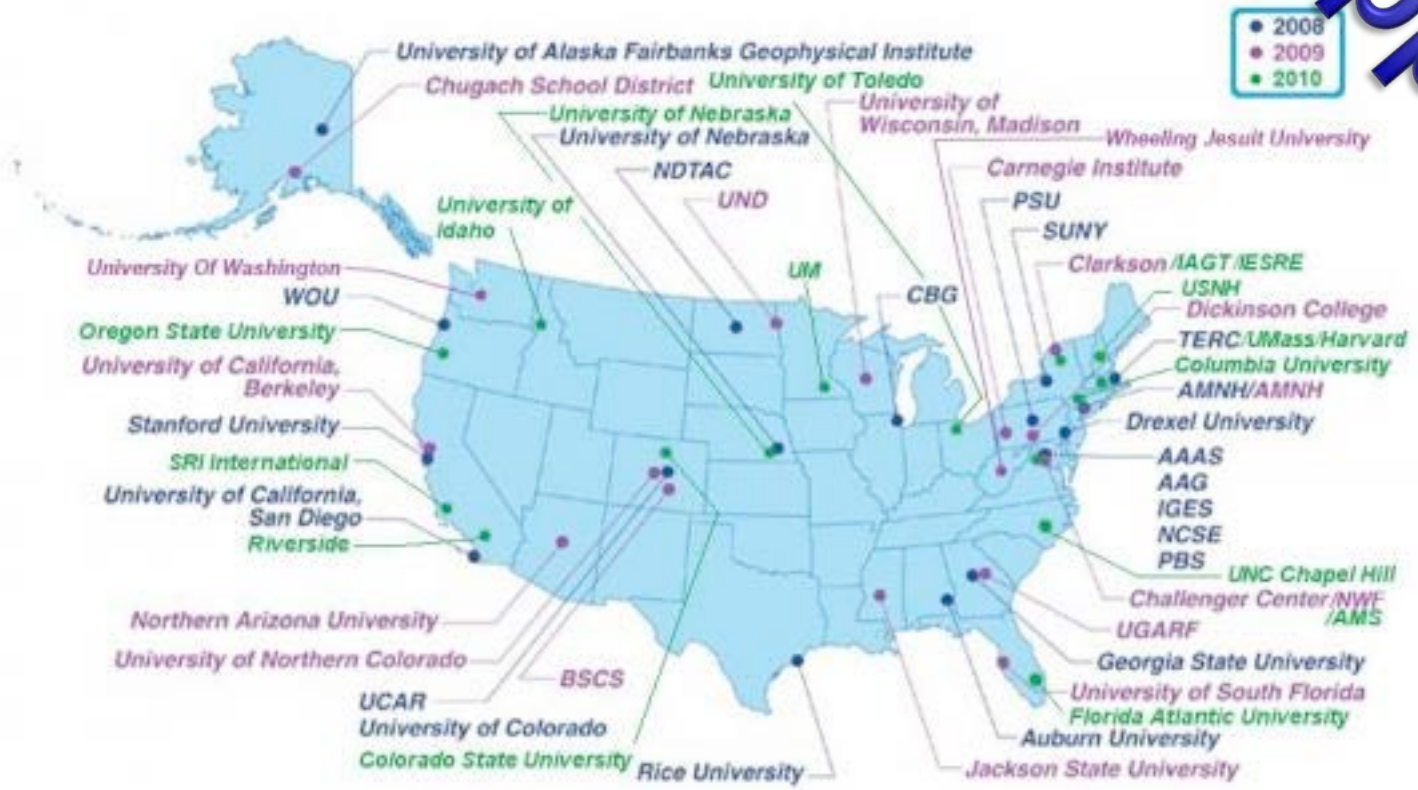





# Awards to Date

- 57 projects
- 3 focus areas:
  - Teacher professional development
  - Use of data and/or models
  - Research experiences

ESIP Opportunity!



# FY 11 Call for Proposals

- Draft CAN release Dec. 1, 2010
- Final EONS NRA Release TBD
- EONS Workshop *Jan. 20, 2011**
- NOI due Jan. 27, 2011
- Proposals due Mar. 2, 2011
- Proposal review Mar.-May 2011
- Selections made *June 2011**
- Awards made *July 2011**
- Project Start Date NLT Sept. 2011

*Goal

# Eligibility

Challenge

- The following U.S. organizations are eligible to propose:
  - Minority higher educational institutions (including HBCU, HSI, TCU, HHE, ANSI, NHSI)
  - Community Colleges
  - Public school districts with high under-represented/under-served enrollment (documented as greater than 50 % of minority students or students eligible for free or reduced-price lunch)
  - Nonprofit organizations with a substantial history of working with under-represented communities

# Teaming Requirements

Challenge

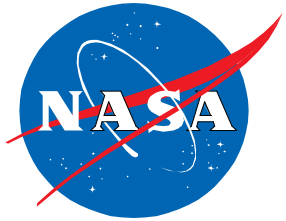
- Because of the interdisciplinary nature of global climate change education, proposal teams *must* include several key partners:
  - One or more *science education* experts, bringing knowledge of current evidence-based research on teaching and learning.
  - One or more *science content* experts, bringing knowledge of current climate change and Earth system science research.
  - At least one team member with extensive knowledge of NASA Earth science, who has expertise in obtaining and correctly applying the specific NASA data sets and/or NASA models and simulations to be used in the proposed project (this may be a NASA scientist, or a NASA-funded university researcher).
- It is expected that an evaluation expert participate in developing and implementing a careful evaluation of the proposed project.

# Partnerships

- Proposals *must,* at a minimum, build on existing climate change education (CCE) efforts to leverage resources and reduce duplication of effort. In particular, proposals that leverage prior funding by partnering with previous awardees in CCE, whether from NASA (GCCE), NSF (CCEP and other integrated activities), NOAA (Environmental Literacy Grants), or other federal agencies, are strongly encouraged.
- It is expected that the budget (up to 49% in total) for partners should be commensurate with their contribution to the proposed project. Non-minority partners may receive up to 45% of the budget. NASA partners may receive up to 10% of the budget.
- Proposals aimed at teacher professional development (PD) should consider ongoing CCE efforts. A list of near-term NASA-related climate PD is maintained at: http://climate.nasa.gov/proDevOpps/.

# Key Information

- Expected budget for new awards - approximately $3M/year
- Number of new awards pending adequate proposals – approximately 7-10
- Duration of awards – 2.5 years
- Award type:  Cooperative Agreement
- Awards may vary in size
- Selecting Official – Richard  Antcliff, Director of the Strategic Relationships Office at NASA LaRC


NASA